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The Survey on the Factors of Cloud-Based Adoption for Small Private Institutions of Higher Learning

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Abstract: *Small Private Institution of Higher Learning (Small Private IHL) recently are looking for new network environment as an alternative for saving the cost in implemented the network infrastructure. Most of the educational institution was not afford to invest in the network infrastructure because it affects the huge cost whereas the smallest Private IHL is only depended on students' tuition fees collection. In addition, the Small Private IHL was suffering in decreasing the number of students for the past few years. Cloud-Based as a network environment is one of the convenient solutions that given the services that store the data as a physical unit on the internet. Formerly a few factors adoption must be considered before implementing Cloud-Based as a network environment at Small Private IHL. The purpose of this paper is to identify the factor adoptions of Cloud-Based as a network environment that is essential in the aspect before implementing the Cloud-Based as a network environment for Small Private IHL. As part of the methodology, the factor adoption was identified as usage benefits, business needs, cost-saving and security. Then the data was collected among a few Small Private IHL. The analysis showed the factor adoption was needed and considered for Small Private IHL before it can be select towards the Cloud-Based as a network environment. Furthermore, it helps the Small Private IHL as a guide in selecting the Cloud-Based as a network environment onward can be the best solution, more economical and convenient to used.*

Keywords: Cloud-Based, network environment, data centre

1. Introduction

The development of IT technology and infrastructure really influences the form and shape in education (Shihan, 2015). Therefore, network technology and infrastructure is the main support to enhance teaching and learning activities (Tick, 2006). Now, most universities are a burden to cater to the increase in setup and maintaining the cost of network technology and infrastructure especially for a Small Private Institution of Higher Learning (Private IHL).

Many educational institutions are not affording to invest in network technology and infrastructure because they spent higher cost (Fernndez, Peralta, Herrera and Bentez, 2012). The world financial crises cause Private IHL to struggle in order to maintain and update the technologies and infrastructures. In addition, there was also non-sufficient of budget allocation for network infrastructure (Yaghmaei and Binesh, 2015). Most of Private IHL only depend on tuition fees from the students as their income, where else the intake of students is inconsistent for every year. The limited physical storage and a limited budget for Private IHL to buy the new network devices has been effected to Private IHL services. Realizing the serious issues for the Private IHL on putting effort on their budget as increase the awareness

to provide the appropriate network technology and infrastructure as the best quality of teaching and learning activities (Mohamed Amin Embi, 2011).

The current network infrastructure has resulted in inefficiencies in IT infrastructure operations, non-optimized resources utilization and higher cost of maintenance, disparate network service and connectivity. Private IHL also discovers the solution to reduce the cost of preparing hardware, setup and maintenance. Private IHL needs to find the other network environment as an alternative to make efficient learning by reducing the cost of infrastructure (Ali, Bajpeye and Srivastava, 2015).

By using on-premise so-called ownership, the Private IHLs must provide the adequate network infrastructure for smooth accesses to the data and it is needed to be maintained by themselves. Whereas the payable Data Centre, the server was outsourced to be managed and maintained by the Data Centre provider. As a result, it was very costly to use the Data Centre for Small Private IHL as a network environment. In Malaysia, the Ownership and Data Centre is the most popular use for network environment but Cloud-Based is a new innovation blueprint from Mampu (2011). Private IHL is still to find other alternatives to reduce the cost of buying infrastructures and cost of operations. Before selecting the Cloud-Based as a network environment a few factors must be considered and emphasized. This research can be used as a guide for factor adoption to Private IHL in order to make the best solution in implemented Cloud-Based as a network environment.

2. Studies on Methodology

In these studies, document analysis was done by reviewing the previous literature. The elements identified from the document analysis was comparing base on the higher frequency of the adoption of the elements discussed in the literature review. Next, the elements getting from the literature discussed and analysis by the IT expert at the preliminary study to get the comment and opinion in the real situation. A few IT experts from a few Small Private IHL was selected. The IT expert came from IT Officer at the Small Private IHL that have experience in handling a few network environments. The purpose of the preliminary study is to determine the validity of the factor adoption that reaches out at the literature review. After the factor adoption review by the IT expert, the data collection was conducted. The data was collected among eight Small Private IHL in order to prove those factor adoptions identified in the preliminary study. The IT expert that has experience in handling network environment is selected as a respondent. The success factor elements selecting base on the opinion of the IT expert was analysing. The result can be used as a guide for factor adoption before a move to Cloud-Based as a network environment.

3. Data Collection

The survey involves Small Private IHL at Shah Alam. The reason in selected the IHL because all the IHL selected have experience in using the network and internet for their learning and business process. The questionnaire in the survey contained five sections. These sections of the survey were demographic, usage benefits, business needs, cost-saving and security. The questionnaire is an open-ended question that content the Likert scale from one (strongly disagree) to five (strongly agree). The questionnaire was adapted from the previous research

because it is similar and suitable for the questionnaire survey needed base on the adoption of the elements used as a guideline for small Private IHL.

In this survey, the 79 experience IT expert was answering the question. IT expert come from IT Officer at the IHL that have experience in handling a network environment at their IHL. The opinion focusing on the factor adoption in implementing Cloud-Based as a network environment at Small Private IHL. Furthermore, after the data were collected, the analysis of data was carried out.

4. Data Analysis

i) Demographic of Data

The demographic analysis cover on various aspect of the respondents with a personal background such as gender, the age range, level of education, working experiences and position in Small Private IHL. The demographic also covers the position and the main duties of the respondent that managing the IHL software, hardware and network. Through the demographic data, able to know years of experiences in handling network environment at the Small Private IHL and how far the experience helps in giving the accurate answer.

From the statistical analysis, the majority of the IT expert was males (67.1%) with an average age between 31 to 45 years old (48.1%). Meanwhile, the level of education was a degree holder (50.6%). In addition, their working experiences were between 6-10 years (27.8%) from the various types of position and the IT executive was the higher position (17.7%). The summary in the below Table 1 shows the demographics:

Table 1: Demographic

Data	Descriptions	Demographic of Data	
		No of Respondents	Percentage (%)
Gender	Male	53	67.1
	Female	26	32.9
Age	21 - 30	33	41.8
	31 - 45	38	48.1
	46 and above	8	10.1
Education Level	SPM	4	5.1
	STPM/ Certificate/ Diploma	15	19.0
	Degree	40	50.6
	Master	19	24.1
	PhD	1	1.30
Working experiences as an IT expert	<1 year	15	19.0
	1 - 2 years	14	17.7
	2 - 5 years	19	24.1
	6 - 10 years	22	27.8
	11 - 15 years	8	10.1

	>16 years	1	1.3
Position	Network Engineer	12	15.2
	Network Consultant	3	3.8
	Product Manager	5	6.3
	Project Coordinator	6	7.6
	IT Executive	14	17.7
	Other	39	49.4

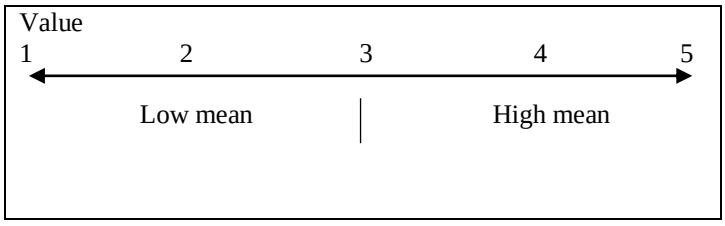
ii) Mean Score

Through this research, the descriptive analysis was used to show the average mean score results for each factor adoption tested. Table 2 shown a few factor adoptions needed to be highlighted as a factor adoption. The factor adoption that given higher average score is usage benefit. These factor adaptions must be highlighted and cleared for the management before move on to Cloud-Based as a network environment. Besides the usage benefit, the business needs are another factor adoption that must be focused. Then the cost-saving and security factors adoption also influenced the Small Private IHL to migrate to Cloud-Based as a network environment. The management and IT experts should understand, supported and realize the factor adoption that influence in using Cloud-Based as a network environment.

Table 2: Average Mean Score for success factor elements

Elements	**No of Item**	**Average Mean Score**
Usage Benefit	4	4.0500
Business Needs	9	4.0100
Cost	6	3.9500
Security	6	3.9700

The analysis of the average mean score of sub-factor adoption was found out based on the Likert scale from one (strongly disagree) to five (strongly agree).



The scale was categories into four (4) different groups shown in Table 3. In short, the sub-factors that given the mean score > 4.0 were determined as an important element that must reach out for factor adoption needed.

Table 3: Mean Categories

Categories	Mean Score
Low	< 2.0
Average	2.0 - < 3.0
High	3.0 - <4.0
Very High	> 4.0

iii) Analysis of factor adoption.

a) Usage Benefit

In this section, all the sub-factors adoption under the usage benefit were important to be stressed because the mean score was greater than 4.0 (> 4.0). Based on the result, the sub-factor adoption of deployment of service proved as the highest mean score in these elements. Table 4 shows a summary of the mean score for each sub-factor adoption.

Table 4: Usage Benefit

Usage Benefit	**Mean Score**
1.Increase storage capacity	4.06
2.Online back-up	4.04
3.Managing internally	4.01
4. Select the deployment of service	4.08

b) Business Needs

From the analysis of the business needs, there was important sub-factor adoption which results in greater than 4.0 (>4.0). These sub-factor adoptions were anytime and anywhere access, improve the performance, make a task quickly, increase productivity and easy to use. These factor adoptions also considered important in selected Cloud-Based as the network environment. Table 5 shows a summary of the mean score for each sub-factor adoption.

Table 5: Business Needs

Business Needs	Mean Score
1.Anytime and anywhere access	4.03
2. Low-cost management provided	3.92
3.Improve the performance	4.08
4.Instant software update	3.87
5.Improved document format compatibility	3.89
6.Efficient access for student and staffs	3.97
7. Make a task quickly	4.09
8.Increase productivity	4.08
9.Easy to use	4.13

c) Cost Saving

From the analysis of the cost-saving, there was important sub-factor adoption which results in greater than 4.0 (>4.0). Through, the analysis of the sub-factor adoption that gives the mean score > 4.0 is reduced operation cost (4.01) given the higher mean score for cost saving. Table 6 shows a summary of the mean score for each sub-factor adoption.

Table 6: Cost Saving

Cost Saving	Mean Score
1.Reduce hardware and infrastructure cost	3.94
2.Reduce software cost	3.97
3.Reduce staff cost	3.95
4.Reduce operation cost	4.01

d) Security

From the perception of analysis on the security, there were significant sub-elements which outcome greater than 4.0 (>4.0). Based on this analysis, the sub-factor adoption with a mean score greater than 4.0 (> 4.0) was safe to store personal data in the cloud, ensure only the right person can access the data, report any failures immediately to the client and the security based on client security request. Table 7 revealed the summary of the mean score for each sub-factor adoption.

Table 7: Security

Security	Mean Score
1.Safe to store personal data in the cloud	4.04
2. Ensure only the right person can access the data	4.01
3. Save the data at the correct form	3.92
4.Report any failures immediately to the client	4.01
5.The security-based on client security request	4.13
6.Fully outsourced disaster recovery	3.73

4. Result and Discussion

In the result was discussion the research analysis finding shown the factor adoption that must consider before migrating to Cloud-Based as a network environment at Small Private IHL. This study has presented the few factors adoption such as usage benefits, business needs, cost-saving and security need to be taken into consideration. From the data analysis, the usage benefit for Small Private IHL in using Cloud-Based as a network environment are given the higher average mean score follows by business need, security elements and cost saving. The mean score showed which factor adoption will be selected base-on higher or lower the mean score value. Mean score show the satisfaction of the IT expert in the s factor adoption tested. The mean score is base-on the IT expert experiences as a respondent in handling network environment.

Furthermore, the analysis was also shown by using Cloud-Based as a network environment it can reduce the cost and more economic. Cloud-Based as a network environment can reduce upfront and ongoing cost including the operation cost. By using Cloud-Based as a network environment can increase storage capacity, online backup and instant software update. Moreover, it can full fill the business need for Small Private IHL. Most of the respondents believe the interaction with Cloud-Based as a network environment is clear and understood. Besides only the right person can access or modify the data rather than the cloud providers itself need to report any failures of data immediately. Most of the respondents believe the interaction with Cloud-Based as a network environment is clear and more understood. By using Cloud-Based as a network environment at Small Private IHL can be accessed at any time, anywhere and easy to use. Therefore, it can lead to the improvement of productivity, performance and make the task quickly.

5. Conclusion and Future work

To ensure the suitability of Cloud-Based as a network environment at the Small Private IHL a few factors adoption must have been taken into knowledge. In addition, the benefits of Cloud-Based as a network environment must be understood clearly by Small Private IHL. The success factor elements were taking as an important element that is essential in the aspect of implementing Cloud-Based as a network environment for Small Private IHL. Through this research, the Small Private IHL must identify and consider the factor adoption before migrating to Cloud-Based as a network environment. The research has shown using Cloud-Based as a network environment can be more beneficial ineffectiveness, efficient and economical to the Small Private IHL. Future work will be discussed on which factors adoption can be the independent elements that influence the successful implementing Cloud-Based as a network environment at the Small Private IHL.

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